

(1) The proposal appears to have been brought up suddenly, without previous warning, towards the latter part of August, at a time when, as is well known, many Government officials are expected to be away on leave, and, consequently, delay is almost certain. It appears also that as soon as the question was gone into by those concerned, it was decided to consent to the proposal on the strict understanding that any further step in the conversion of the existing horse-tramway between East Greenwich and Woolwich should be by extension of the conduit system eastwards, and not of the trolley system westwards. It is, of course, impossible to say how long it will be before this decision can have any practical effect, but it is certain that no further delay can be attributed to the observatory.

(2) As regards the authorised tramway from Woolwich to Eltham, we find that many Eltham residents are strongly opposed to the overhead system, while the official position is not one of hostility to the overhead system *per se*, but of insisting on insulated returns, any system which ensures this for the protection of Greenwich magnetic records being free from this official objection. As a case in point, the G.B. surface-contact system was proposed by the County Council several years ago and sanctioned officially, but was then dropped after some inconclusive experiments. Recently a new surface-contact system, the S.P. system, was made the subject of an article in *Engineering*, May 28, and claims to avoid the risk of danger alleged against the G.B. system. It has been tried and favourably reported on, but has not apparently been suggested for the Woolwich and Eltham tramway.

The official attitude thus seems perfectly consistent and reasonable, and not unsympathetic. The suggestion of overhead wires without insulated returns within a radius of three miles from the observatory ought once for all to be dropped. If the County Council objects to the expense of the conduit system and to the inconvenience of equipping the overhead system with insulated returns, it is for them to find a satisfactory alternative. Unless the protective clauses insisted on by the Government are to become a dead letter, it is futile to try to blame the observatory for delay or obstruction, and it is in the last degree unlikely that the Admiralty will be persuaded to stultify its own action and contention by allowing these clauses to be overridden.

PETER BARR.

THE name of this eminent horticulturist, whose death we announced last week, will ever be associated with the development of narcissi. Born in 1826, in the former village of Govan, which has long since been absorbed in the city of Glasgow, he was the son of a mill-owner who found recreation from weaving in the cultivation of tulips and other florists' flowers. The son appears to have inherited a strong love for floriculture, for he soon tired of the looms, and obtained employment in various seed businesses, until in 1861 he commenced business, with a partner, on the site of the present premises of Messrs. Barr and Sons, King Street, Covent Garden, under the title of Barr and Sugden. Barr then directed his attention to practical floriculture, experimenting with hellebores (Christmas roses), tulips, lilies, and pæonies. For these purposes he found it necessary to take up a piece of ground at Tooting, where he conducted trials which interested the leading florists of the day. He next scoured the country over

for narcissi, meeting with considerable success in his quest. Two amateurs had already formed wonderful collections of these flowers which, unknown to the general public, they had cultivated for nearly a quarter of a century. These were Mr. W. Backhouse, of Darlington, and Mr. Edward Leeds, of Manchester. Barr made up his mind that if he could only obtain possession of these collections he would have all the best of existing daffodils in his own possession. By dint of perseverance and enterprise he succeeded in this, and the collections were removed to Tooting, where for years afterwards new seedling varieties flowered every year. Every variety worth cultivating was named and its name registered, for he recognised that no commercial success would follow unless the public could be assured that every plant catalogued was accurately and intelligently named. But the varieties continued to multiply so greatly that he found it necessary to elaborate a classification, grouping the sorts into sections according to the length of the trumpet or perianth tube and other characteristics. Mainly owing to Barr's representations, the Royal Horticultural Society promoted a Daffodil Conference in 1884, and his system of classification was then, in the main, adopted. Not long after this the attention of market growers was directed to these bulbs, and in the Scilly Isles, in Cornwall, in Lincolnshire, and other places acres of land were planted for the purpose of supplying the markets with cut blooms, with the result we see to-day in the millions of flowers that are offered everywhere for sale.

Peter Barr retired from business in 1896, after botanising in various places in Europe for the purpose of collecting rare daffodils in their native habitats. In 1808 he began a tour round the world, which lasted seven years. He visited America, Canada, Japan, China, Australia, New Zealand, and, on his way home, spent twenty-one months in South Africa. During this world tour he lectured on daffodils, and was interviewed and acclaimed almost everywhere as the "Daffodil King," a title which had been given him in this country by his fellow-floriculturists.

One of the finest white trumpet daffodils ever raised was distributed a few years ago by his firm, and it was named after Peter Barr.

NOTES.

WE learn from the *Times*, with deep regret, of the death, on Sunday last, of Prof. Anton Dohrn, the founder and director of the Zoological Station at Naples.

SIR THOMAS ELLIOTT, Secretary to the Board of Agriculture and Fisheries, has been nominated by the French Government to be a Companion of the Order "du Mérite Agricole."

IN view of the retirement, to which reference has been made in these columns already, of Prof. J. Cleland, F.R.S., from the chair of anatomy, and of Prof. Jack from the chair of mathematics, at the end of the present month, there has been set on foot, on the initiative of the business committee of the general council of the University of Glasgow, a movement for making appropriate recognition of their long and distinguished services. Circulars have been issued to the whole body of university graduates and to members of other learned bodies with which Profs. Cleland and Jack have been connected. In the circulars it is stated that the form of recognition will, to a large extent, depend on the amounts subscribed, but it is thought that it might fitly include the provision of some fund for

the advancement of anatomical and anthropological science in the case of Prof. Cleland, and of mathematical science in the case of Prof. Jack, and the presentation to the University of portraits or busts by an eminent artist. Representative committees have been formed to administer each fund, and the preliminary lists of subscriptions show that the movement has already met with a hearty response. Men of science and others desiring to take part in the recognition and to contribute to either fund are invited to communicate with the honorary secretary and treasurer, Mr. Archibald Craig, clerk of the University general council, 149 West George Street, Glasgow.

THE Antarctic vessel *Nimrod*, now moored in the Thames off the Temple Pier, was opened yesterday for the inspection of the public by the Lord Mayor of London.

SHOCKS of earthquake on the morning of September 22 are reported from the Bouches-du-Rhône, Rognes, Reggio di Calabria, Messina, and Athens, but in no case does much damage appear to have been done.

It is stated by the British Antarctic Expedition, 1910, that arrangements have been made for the purchase of the *Terra Nova* for the projected expedition of next year. The vessel, which is a whaler, was built in 1884. In 1903 she was purchased by the Admiralty as relief ship for the *Discovery* expedition. The year 1905 saw her in the service of the North Polar expedition, on a visit to Franz Josef Land. The size and strength of the ship make her a fitting receptacle for the extensive equipment which it is necessary she should carry for the full success of the plans of the expedition. After being duly inspected on behalf of the expedition in Newfoundland she will sail for England and, it is hoped, reach the Thames about the end of October or early in November. The officers and crew for the expedition have now been selected.

THE presidential address of Mr. W. Noble Twelvetees will be delivered to the Civil and Mechanical Engineers' Society at Caxton Hall, Westminster, on Thursday, October 7.

ACCORDING to a *Times* correspondent a group of French, German, and Belgian patrons of aviation are offering a prize of 10,000*l.* to be awarded to the aviator who rises, with a fixed point as centre, to a height of 250 metres, flies a thousand metres from this altitude in a horizontal direction, and finally, returning, soars for a quarter of an hour at a height of 20 metres over the point of departure. An alternative feat is to make a flight from Brussels to Paris or from Brussels to Cologne, without a stop, at a speed of 60 kilometres an hour.

It is stated in *Tropical Life* that an International Cotton and Fibre Exhibition will be held in London in 1912, and that in conjunction with it there will be an important conference for the purpose of considering the cotton and fibre questions in their various aspects. A section of the exhibition will be devoted to other fibres, animal, vegetable, and mineral.

ACCORDING to a Reuter message from Rome, the Juba, in Benadir, has formed a new mouth. Some months ago a violent typhoon broke through the spit of land separating the sea from that part of the river which runs parallel with the coast, and the action of the sea and the current combined have since made a new mouth 450 yards in breadth and formed a long lagoon which, with little expense, can be converted into a serviceable harbour. The same message states that the Italian Resident, Captain Ferrari, has found that the Webbi Shebeli does

not, as was supposed, lose itself in marshes in the Ballis country, but is an affluent of the Juba, into which it runs some 120 miles from the latter's mouth.

THE *Electrician* states that a gift has been made to the American Institute of Electrical Engineers by the Western Electric Company of a valuable collection of patent specifications. The specifications range from May 30, 1871, to December, 1908, and number approximately 100,000.

AMONG the popular lectures shortly to be delivered at the Royal Victoria Hall, Waterloo Bridge Road, are the following:—on October 5, "Marconi's Transatlantic Wireless Telegraphy," by Prof. W. Lynd; on October 19, "The Great Earthquake in Jamaica," by Dr. Vaughan Cornish; on October 26, "New Guinea," by Mr. J. E. Liddiard.

THE annual exhibition of the Royal Photographic Society, at the New Gallery, Regent Street, will remain open until the end of October. It is divided into four principal sections—pictorial, scientific and technical, professional work, and trade exhibits of apparatus and materials. The scientific student will find matters of interest in every section, including even the pictorial, for, as the society has reverted to its old custom of stating the method of production, the pictorial photographs may be looked upon, if so desired, as specimens of the various processes. The section specially devoted to scientific and technical subjects is this year of a wider interest than usual. The greater number of exhibits represent the character and habits of various living creatures, from the largest to the smallest, and in this department is included special collections of work by the Zoological Photographic Club and by a number of German naturalists, the latter having been collected by R. Voightländer, of Leipzig. The astronomical photographs include recent plates from Greenwich, Stonyhurst College, and the Heidelberg Observatory. Among those who show spectrum photographs we notice the names of Prof. Zeeman, Prof. H. Kayser, A. Fowler, and C. H. Fabry and H. Buisson. Dr. C. L. Leonard contributes Röntgen-ray photographs that show peristaltic waves in the stomach and intestines. Experiments on the resolving power and other properties of photographic plates are shown by C. E. K. Mees and E. K. Hunter. Photomicrography, telephotography, and balloon photography are well represented, and there are a few interesting exhibits that refer to the methods of process work. Of colour photography, although there are many specimens, the only progress indicated is in the direction of the perfecting of the newer plates, more particularly the Thames plate. The regular disposition of the three colours in this plate renders it specially adaptable to reproduction by different methods. We would point out that many photographs of great interest are mounted as lantern-slides, and that these are shown on a stand by themselves, away from the general collection of scientific and technical exhibits.

RAINY, cool, and unsettled weather has prevailed throughout September, and although the rainfall in the aggregate has not generally been excessive, there have been few days without rain, except during the third week of the month. The total measurement of rain is in excess of the average in London by about 0.3 inch, and rain fell on nineteen days. The day temperatures have continued remarkably low for the time of year, and at the London reporting station of the Meteorological Office, in St. James's Park, the sheltered thermometer has not once touched 70°. At Greenwich there was only one day with 70° or above, the highest reading being 71°, on September 6. There has not been so cold a September since 1897, and as recently as 1907 there were fifteen days during the month with a

temperature of 70° or above. Our weather over the British Islands has been chiefly under the influence of cyclonic disturbances, which have arrived with considerable frequency from off the Atlantic.

In the September number of the *American Naturalist* Dr. R. F. Scharff reviews the evidence in favour of an early Tertiary land-connection between North and South America. He believes in the existence during early Tertiary times of a strip of land connecting western North America with Chile, when Central America and northern South America were submerged. Such a connection, it is urged, is supported by many lines of evidence, and would serve to explain the occurrence of Eocene armadillos in North America and the affinity between the Canadian porcupine (*Erethizon*) and the Santa Crucian *Stiromys*.

In addition to their great abundance, the star-fishes of Alaska and British Columbia are remarkable, according to a paper by Prof. A. E. Verrill in the September issue of the *American Naturalist*, for the redundancy in the number of their rays, this being specially noticeable in the family Asteriidae, the members of which, despite many exceptions, are generally five-rayed in other parts of the world. "Besides the species that normally have an increased number of rays, or vary indefinitely, there are others which have, more or less rarely, a smaller or larger number as monstrosities. . . . Various other monstrous variations occur somewhat frequently, such as forked rays, supernumerary rays arising from the dorsal surface, &c."

The second part of the first volume of the Records of the Canterbury Museum (New Zealand) contains an account of the scientific results of a trawling expedition undertaken by the New Zealand Government in 1907. The expedition seems to have been organised entirely from the commercial point of view, and the facilities afforded for scientific investigation were by no means so great as they might have been. It is therefore not surprising that the scientific results are somewhat meagre. This is the more unfortunate, as we still know comparatively little about the marine biology of the waters around the New Zealand coast. The investigations, chiefly of local naturalists, have made us very fully acquainted with the terrestrial fauna of the Dominion, and much has been done in the way of shore-collecting; but systematic marine biological research is, as a rule, beyond the reach of private individuals, and it is here that an enlightened Government might be fairly expected to take an opportunity for encouraging the advancement of science.

Protozoology is very much in evidence in vol. liii., part iv., of the *Quarterly Journal of Microscopical Science*, which contains no fewer than five papers on this subject. Miss Muriel Robertson describes the life-cycle of a new trypanosome from Ceylon, of which the principal host is the soft tortoise, *Emyda vittata*, and the intermediate host a leech of the genus *Glossiphonia*. Mr. C. Clifford Dobell describes the processes of physiological degeneration and death in *Entamoeba ranarum*. Dr. McCarrison places on record his observations on the Amoeba in the intestines of persons suffering from goitre in Gilgit; Dr. Row describes the development of the parasite of oriental sore in cultures; and Prof. Minchin discusses the structure of *Trypanosoma lewisi* in relation to microscopical technique. Several of these papers are remarkable for the beauty of the coloured plates which accompany them, and the same is true of a short paper by Messrs. Muir and Kershaw describing, under the name *Peripatus ceramensis*, a new species of *Peripatus* from Ceram, the first to be recorded from the Moluccas. In the same

number Mr. Joseph Mangan describes the entry of zoöxanthellæ into the ovum of *Millepora*, and gives some particulars concerning the medusæ.

THE report on forest administration in Southern Nigeria for 1907 contains an account of a tour through the west provinces, described by Mr. H. N. Thompson, the conservator of forests. Two fine forest tracts were explored at Ijaye and Ilesha, both of which are situated in the dry-zone vegetation. The first-named is called after an ancient town which was destroyed about sixty years ago, and since that time part of the forest has grown up. Here there were found to be mahogany trees with a girth measurement exceeding 10 feet, which implies a much more rapid rate of growth than is betokened by ring counts. The same conclusion is derived from the dimensions of trees planted in the botanical gardens, wherefore Mr. Thompson advances the opinion that probably the mahogany trees show three or four well-marked zones of growth each year, corresponding to the four definite seasons.

THE reasons for deterioration that follow upon self-fertilisation or inbreeding of the maize plant have been investigated by Dr. G. H. Shull, who puts forward in the publication of the American Breeders' Association (vols. iv. and v.) certain conclusions based on the results of experimental cultivation. Plants selected according to the number of rows of grain in the ear were allowed to self-fertilise, when two strains became evident. For reasons which are given, it is considered that the individuals in a maize field are generally very complex hybrids, and that these strains are elementary species or biotypes, so that, according to the author's premises, self-fertilisation tends to isolate elementary forms, producing a homozygous condition, i.e. pure forms. Crosses between the two strains led to a distinct increase in the yield, whence the following method of propagation is suggested. Pure races of maize are to be obtained by self-fertilisation, and the crosses made between these pure races provide seed corn for the field crop.

BOTANICAL teachers making use of lantern-slides may be glad to know of a new series of slides produced by Messrs. F. E. Becker and Co., Hatton Wall, London, from original photomicrographic negatives prepared by Mr. C. W. Greaves. A first series of fifty slides is announced, of which several relate to sections of anomalous dicotyledonous stems, others to the anatomy of stem, leaf, and root of angiosperms and the pine; a few represent cryptogamic and fossil sections. The phanerogamic specimens examined are clear and well defined, being taken from good microscopic sections, and the section of a *Fucus* conceptacle is excellent in general contour and detail.

AN abstract of the report of the director of the Bombay Bacteriological Laboratory for 1908 appears in the *British Medical Journal*, from which we learn that the issue of anti-plague vaccine was little short of that of the preceding year, when the disease was severely and widely prevalent, the number of doses dispatched being 533,315 against 620,923. Experiments were carried out regarding the efficiency of rat and rat-flea destroyers, but they were not satisfactory or conclusive. The general bacteriological work was of a varied description. Special inquiry was made regarding an outbreak of malaria in the fort and dock area of Bombay; the investigation is still in progress. An outbreak of relapsing fever in the Kolaka district was also made the subject of special study. The laboratory rendered assistance and advice regarding questions relating to plague and other infective diseases, and courses of in-

struction were arranged for hospital assistants and others with reference to plague inoculation and bacteriological work.

MR. C. CARUS-WILSON has printed a paper, read by him before the Geological Society of London, on the pitting of flint surfaces. He directs attention to the frequently polygonal and rudely hexagonal character of the outer ends of the pits found on flints in a certain stage of decomposition, and to the considerable amount of water that may be absorbed by the external layers of such flints. But he shows much uncertainty of view as to the mode of origin of the pits; the suggestion made in the text that their polygonal outlines are connected with the crystalline form of the absorbed water as it froze seems, to say the least, fantastic. In a footnote, however, the author compares these outlines with the shrinkage-cracks of such rocks as basalt, and regards the ice merely as the agent that split off the lost portions of the flint. Would it not be simpler to regard the rudely polygonal outlines as resulting from the intersection of successively formed and adjacent cup-like surfaces of fracture?

WE have received the report of the chief inspector of mines in Mysore for the year 1907-8, which opens with the statement that there was a large diminution in the number of applications for mining licenses as compared with the previous year; the statistics of licenses granted show, on the other hand, an increase from 101 in 1906 to 242 in 1907. The gold production showed a decrease of 5.84 per cent. as against a decrease of 8.67 per cent. in 1906, the comparison in each case being with the previous year; it amounted to a value of 2,041,129*l.* in 1907, and the total value of bullion produced from the commencement of mining operations in 1882 to the end of June, 1908, was 28,598,155*l.* Air blasts seem still to be frequent, but there was a decrease in the number of accidents. Statistics are given of the production of manganese and chrome, 82,835 tons and 11,197 tons respectively, but as regards other minerals it is reported that the statistics have been handed over to the curator of the Geological Museum for report as to whether it is possible to extract any useful information from them.

THE Proceedings of the Royal Society of Edinburgh (vol. xxix., p. 602) contains a paper, by Mr. E. M. Wedderburn, on the deep-water oscillations recently described by Prof. Petersson (*NATURE*, August 12, p. 197). Working on a suggestion made by Sir John Murray, Mr. Wedderburn adduces evidence to show that the oscillations observed in the Skagerak are analogous to those which have been observed by the Scottish Lake Survey, and that they really show the presence, not of a long-period tide, but of a temperature seiche, having its node at the mouth of the Skagerak and its loop at the point of observation.

A PRELIMINARY summary report on coast changes in east Yorkshire, by Mr. T. Sheppard, of The Museum, Hull, forms a contribution to the investigation of the larger question of changes on the east-coast region of England during the historical period, undertaken by the research department of the Royal Geographical Society. Mr. Sheppard, after pointing out that the coast line between Bridlington and Spurn Point is of special interest because, while on the one hand enormous tracts of land have disappeared within historic times, on the other large areas have been formed, embanked, and cultivated, divides his district into five sections, the Holderness coast from Bridlington to Kilnsea, Spurn Point, the North Humber shore, the South Humber shore, and the Humber itself. Each district is treated from the point of view of geological

evidence, historical evidence, and actual measurement. The general results indicate a wastage of the thirty miles of cliff between Bridlington and Spurn at a rate of about 7 feet per annum, and a growth on the Spurn during recent years of 17 feet per annum southward, with a net increase of 9 feet per annum in the width of the point. To the west of the Humber are large areas of land, now partly cultivated and productive, which were formerly watery wastes.

AN important paper on evaporation in Egypt and the Sudan, by Mr. B. F. E. Keeling, is published by the Survey Department of Egypt. The author first deals with the results of comparisons of various types of evaporimeters used in Egypt at different times. Those now in use are mostly of the Piche and Wild patterns, exposed in double-louvred screens; their readings are apparently comparable in different climates, if similarly exposed, where the mean wind velocities are not widely different. A table is given showing the mean daily evaporation at stations in the Nile Valley; in Egypt and the North Sudan it is greater in the summer, while in the rainy areas it is at a maximum in the dry winter season, as is to be expected. One section of the report deals with the evaporation from open expanses of water. In the neighbourhood of Cairo the mean amount was 4.2 mm. per day (winter 3 mm., summer 5.3 mm.); on Lake Victoria it is estimated at 3 mm. per day. In the last section some remarks are made on the relation of evaporation to other meteorological factors; the mean daily curve of evaporation at Helwan closely follows the curve of saturation deficit.

IN the September issue of *Man* Prof. Flinders Petrie describes a find of string nets of the seventeenth Egyptian dynasty which are practically unique. They were found associated with an untouched burial near Thebes. This is, perhaps, the most varied and rich collection of funeral remains which has ever been brought from Egypt. It will be preserved as an entire group in the Royal Scottish Museum, Edinburgh. The corpse was enclosed in a single coffin painted with wings in blue and gold. On the neck was a splendid golden collar; on each arm a gold armet; round the waist an electrum girdle, copied from a Nubian pattern, made of seeds and leather. The whole collection of jewellery weighs half a pound avoirdupois—the largest group of gold-work which has ever left Egypt. The string nets associated with these remains, of which Prof. Petrie gives photographs, illustrate the remarkable skill in string-working attained by the Egyptians of that era. He also announces the discovery, at Memphis, of the great palace of King Apries (about 580 B.C.). Scale armour, bronzes, a remarkable silver plaque with a gold figure of Hathor, and a great carved portal, now in ruins, are part of the discoveries at this site.

IN the September issue of *Man* Dr. C. G. Seligmann describes what is known as the Bandar cult among the Kandyen Sinhalese. It is a form of ancestor worship, Bandar being the title applied to the canonised spirits of eminent persons to whom, soon after their death, offerings are presented in order to induce them to protect the worshipper from evil and to grant him good fortune. One of the most important of these spirits is Kosgama Bandar, who takes his name from the village in which he lived in the eighteenth century or earlier. He seems to have rebelled against the King of Kandy, by whom he was captured and executed. He and similar spirits exercise authority under the control of Skanda, one of the four guardian deities of Ceylon. Dr. Seligmann prints, with a translation, a curious invocation addressed to this spirit.

FASCICULES 1 and 2 of the *Bulletin des Séances de la Société française de Physique* for 1909 contain thirteen memoirs, several of which have already been noticed in these columns. Amongst those not previously dealt with may be mentioned that by M. G. Delvalez, on the Hall effect in liquids. According to the electronic theory of conduction of electricity, this effect should be extremely small, while experiment appeared to show that it was a million times greater than the theoretical value. M. Delvalez has succeeded in showing that these observed effects were due to the convection currents in the liquid, set up because it is a mobile conductor carrying current through a magnetic field. The motion generates an electromotive force, which has been measured as the Hall effect. By using an alternating electromotive force to produce his main current, and arranging to balance the Hall electromotive force against the fall of potential down an induction free resistance traversed by the main current, he has shown that the effect is very small, certainly less than one three-thousandth of the value previously observed.

THE use of platinum felt, as suggested by Monroe in 1888, in place of asbestos as a filtering medium is recommended by Mr. W. O. Snelling in a paper in the *Journal of the American Chemical Society* (vol. xxxi., pp. 456-461). In addition to its insolubility in almost all the ordinary chemical agents, it has the advantage of extraordinary porosity, combined with the power of retaining completely and easily such finely divided precipitates as barium sulphate and calcium oxalate; a series of tests showed that the filtration was six times more rapid than with an asbestos filter containing one-third the quantity of asbestos. The precipitate can be dissolved off, and the felt used again and again; moreover, a damaged filter can readily be patched by the adding of chloroplatinic acid and igniting. The use of the "Monroe crucible" for atomic-weight determinations is especially advocated. Another issue of the same journal contains a paper by Mr. J. T. Stoddard on rapid electro-analysis with stationary electrodes (*ibid.*, pp. 385-390), in which it is claimed that by using a kathode of gauze or of mercury, a stationary anode, and a heavy current, complete decomposition of the metal can be effected as rapidly as with a rotating electrode; under these conditions the liberation of gas, and the convection currents consequent on the heating of the liquid, appear to provide sufficiently for the agitation of the fluid without recourse to mechanical methods.

THE *Philippine Journal of Science* for March contains a third paper by Raymond F. Bacon on the Philippine terpenes and essential oils, and a paper by Mr. H. D. Gibbs on the oxidation of phenol. The latter author has taken advantage of the tropical sunshine to study the red coloration which is developed by phenol when exposed to air and light, and has carried out the investigation with remarkable care and thoroughness. He shows that the phenol becomes coloured in presence of oxygen, but not of hydrogen, nitrogen, and carbon dioxide. The action is caused by oxidation, quinol, quinone, catechol, and carbon dioxide being produced; the principal coloured compounds are probably quinone condensation products, the red colour being attributed to phenoquinone. The oxidation is not appreciable in the dark at room-temperatures, but becomes measurable at 100°, and fairly rapid at the boiling point of phenol. In sunlight the rate of coloration is rapid, and increases with the temperature; it is affected by the ultra-violet absorption of the glass, by atmospheric conditions, and by the altitude of the sun. Ozone is very reactive; it gives the same products as oxygen, and in addition

glyoxylic acid has been detected. Anisol, the methyl ether of phenol, gives no coloration either by the action of ozone or of oxygen and sunlight.

MESSRS. E. B. ATKINSON AND CO., of Hull, forward us an improved pattern of Soxhlet's apparatus for the extraction of oils and fats. The new form is fitted with a glass stop-cock on the syphon tube. By regulating the overflow, the thimble can be kept full of the solvent during the extraction, instead of being alternately filled and emptied. Also, by closing the stop-cock at the end of an operation, the solvent can be retained in the upper part of the apparatus; this allows the flask containing the extracted fat to be almost freed from the solvent, so that it can be placed straightway in the drying-oven. A bulb on the upper part of the side-tube facilitates the passage of the vaporised solvent if liquid should collect there. The new pattern thus appears to have distinct advantages over the older form.

THE use of the Walschaerts valve gear on American locomotives has been greatly extended since its introduction into the States a few years ago. The advantages of this gear render it very suitable for the large engines employed in America, and its success has led to experiments with others of a similar type. Several railways are now trying the Pilliod motion, a gear made by the Pilliod Company of Chicago, and described in the *Engineer* for September 3. In this gear, as in the Walschaerts, the motion is derived partly from a return crank on the main crank-pin and partly from the crosshead. The moving parts are the same for any class of engine, and weigh about 1000 lb. There is no load on the reversing lever, which can be unlatched and moved in any condition with the regulator either open or closed. The motion is expected to effect a considerable saving in fuel and in maintenance and repairs. The release is late; thus with cut-off at 25 per cent. the release is at 85 per cent.; the Walschaerts gear, with a similar cut-off, releases at about 65 per cent. of the stroke. Special adaptability for high speeds is claimed.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN OCTOBER:—

- Oct. 6. 11h. 59m. to 12h. 34m. Moon occults κ Geminorum (mag. 3.7).
- 8. 10h. 37m. Minimum of Algol (δ Persei).
- 11. 7h. 26m. " "
- 12. 23h. Venus in conjunction " with δ Scorpii (s'ar $0^{\circ} 7' S.$).
- 13. 6h. Saturn in opposition to the Sun.
- 17. 17h. Venus in conjunction with the Moon (Venus $2^{\circ} 17' S.$).
- 18-24. Epoch of October meteoric shower (Orionids, Radiant $92^{\circ} \pm 15^{\circ}$).
- 20. Saturn. Major axis of outer ring = $46.15''$, Minor axis = $9.21''$.
- 27. 8h. Saturn in conjunction with the Moon (Saturn $1^{\circ} 17' N.$).
- " 19h. Mercury at greatest elongation west.
- 31. 9h. 8m. Minimum of Algol (δ Persei).

OBSERVATIONS OF HALLEY'S COMET, 1909c.—Photographs showing Halley's comet were obtained at the Greenwich Observatory, with the 30-inch reflector, on September 9, two days before it was discovered by Prof. Wolf. Owing to the proximity of the moon the two exposures were limited to thirty minutes and twenty-five minutes respectively, and the very faint cometary images were not identified until after the receipt of the telegram announcing the discovery at Heidelberg. The positions determined gave corrections of +24s. and -4' to the ephemeris published in No. 4330 of the *Astronomische Nachrichten*.

In a supplement to No. 4356 of the *Astronomische Nachrichten*, where the above observations are recorded,